No. 815,966. PATENTED MAR. 27, 1906.

A. C. LYNCH.

DUST COLLECTOR AND SEPARATOR.

APPLICATION FILED SEPT. 17, 1904.

Fig. 1.

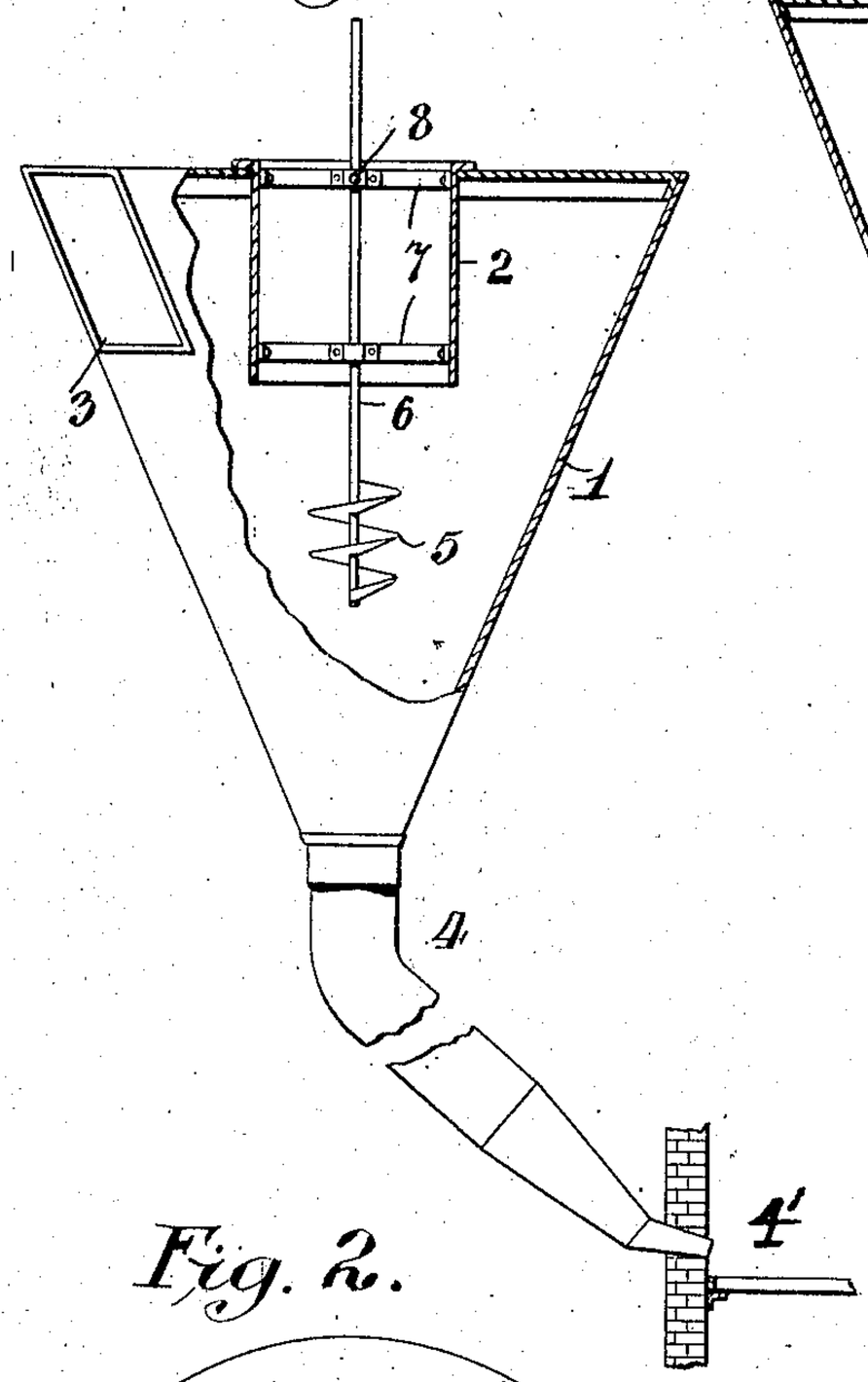


Fig. 2.

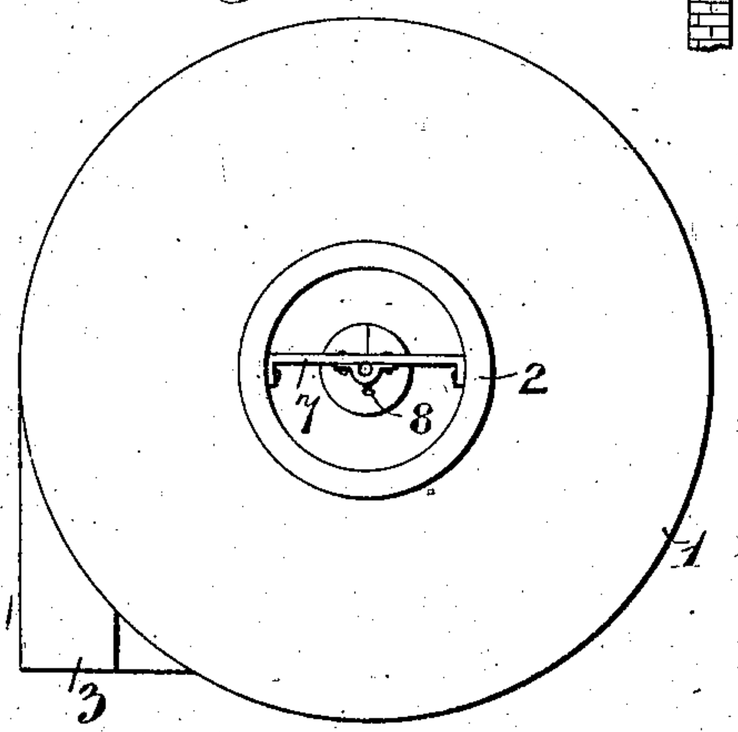


Fig. 3.

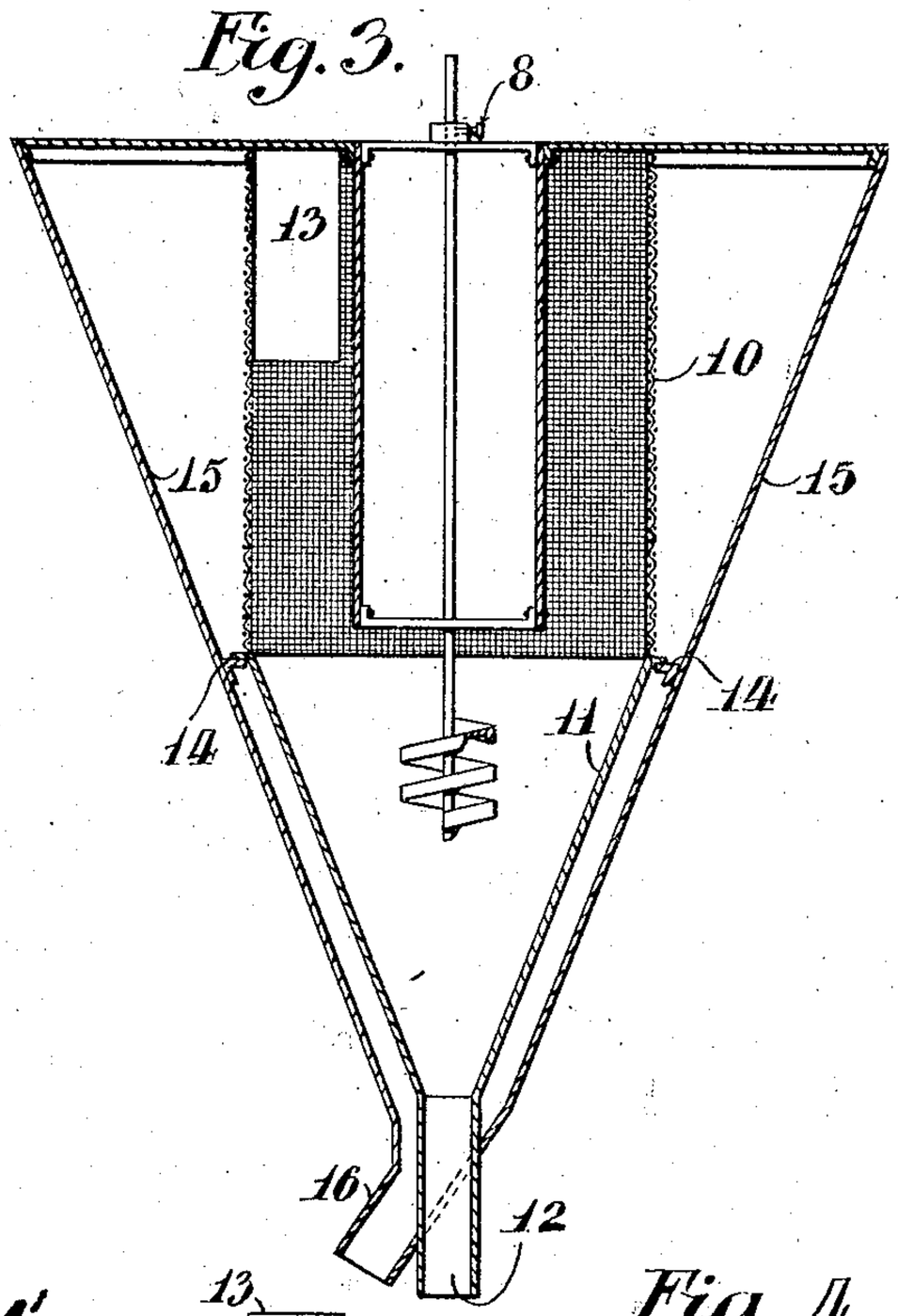
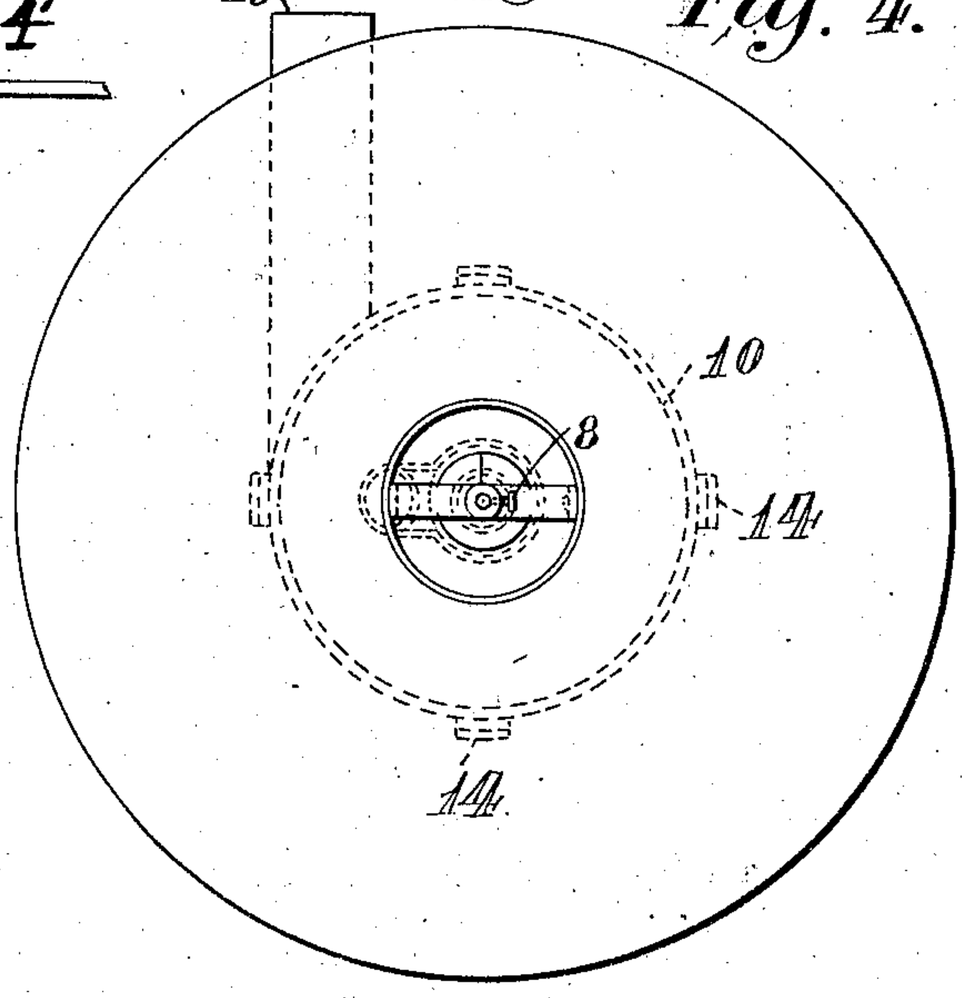


Fig. 4.



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UNITED STATES PATENT OFFICE.

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DUST COLLECTOR AND SEPARATOR.

No. 815,966. Specification of Letters Patent. Patented March 27, 1906.

Application filed September 17, 1904. Serial No. 224,792.

To all whom it may concern:

Be it known that I, ARTHUR C. LYNCH, a citizen of the United States, residing at Richmond Hill, county of Queens, State of New York, (whose post-office address is the same,) have invented certain new and useful Improvements in Dust Collectors and Separators, of which the following is a full, true, and concise specification.

The invention relates to improvements in devices for collecting and separating dust, chips, shavings, and other solid particles from air, and it involves novel features of operation and arrangement of parts whereby the action of devices of this kind is improved and certain other advantages secured, as will be hereinafter fully described, and more particularly pointed out in the appended claims.

Referring to the accompanying drawings, forming a part hereof, Figure 1 represents a side elevation, with parts in section, of a centrifugal dust-collector comprising apparatus of this invention. Fig. 2 is a plan view thereof. Fig. 3 is a central vertical section of apparatus for collecting and separating solid particles of different sizes into different groups, and Fig. 4 is a plan view thereof.

The apparatus illustrated in Fig. 1 comprises a casing 1 of conical or tapering shape having at its larger end an air-escape orifice formed by the spout 2 and a tangential air-inlet, (indicated by the numeral 3.) At the lower end or apex of the tapering separating-chamber of the casing 1 there is an opening for the discharge of the separated solid matter, and from thence a pipe 4 leads to the fire-box of a furnace 4′ or to any other locality in which the said matter is desired to be deposited. Air entering the separating-chamber through the tangential inlet 3 receives a whirling or gyratory motion, forming a vortex therein, and the solid matter mixed with the air is thrown by centrifugal force against the side wall thereof and gradually slides down the incline and out into the discharge-pipe 4, while the air near the central portion of the whirling body or vortex, becoming in this manner freed from solid matter, rises through the air-escape orifice out into the atmosphere. The apparatus so far described is common in this art and will not require further explanation.

Within the separating-chamber, between the openings 2 and 4 thereof, is disposed means for producing a current of air outwardly through the discharge-opening for facilitating the exit and discharge of the solid matter therethrough. This means is stationary and utilizes the gyratory motion of the whirling body of air to direct a portion thereof through the opening and to this end may assume various constructional forms. In preferred form it consists of a spirally-formed disk 5, mounted upon a rod 6, the latter being fixedly held in cross-supports 7, spanning the diameter of the air-escape spout 2. The rod 6 is preferably disposed centrally with respect to the whirling body of air, so that the said spiral disk or air-conveyer will lie in the axis of the vortex thereof. A small percentage of the whirling air will be caught by the edges of this disk and directed downwardly and outwardly through the passage 4, carrying with it the accumulated separated matter and at the same time obviating any tendency for ascendent air-currents therethrough. The force of this outward current depends, primarily, upon the velocity of the whirling air, and, secondarily, upon the diameter and pitch of the spiral disk, as well as upon the relative position of the same with respect to the apex of the tapering chamber, and regulation of the force of the outward current may therefore be secured by varying any of these functions. Most conveniently the relative position of the spiral with respect to the apex of the chamber may be changed, and to this end the rod 6 is adjustably mounted within its cross-supports, being held in adjustable position by the thumb-screw 8. In systems wherein the solid matter under manipulation is combustible and is utilized as fuel, as represented by the drawings, it is obvious that the necessary supply of air for the combustion of the same can be nicely regulated in proportion to the amount of fuel discharged by means of the regulation just described, and in any event the outward current facilitates the discharge of the separated matter.

The apparatus of Figs. 3 and 4 operates in a similar manner to that just described, but is designed also to separate larger particles from relative smaller particles carried into it by the same current of air. It comprises an inner separating-chamber bounded by a per-

forate wall 10, which may be a woven-wire screen preferably of cylindrical shape, as shown. The bottom of this chamber is provided by a tapered or conical wall 11, terminating at its apex in a discharge-opening 12, through which separated matter of the coarser grade is discharged. At the upper or larger end of the separating-chamber there is a central air-escape orifice provided by a spout similar to the spout 2 of the preceding figures and a tangential inlet 13, similar to the inlet 3, except that it passes through an exterior chamber, presently described. The screen and tapered wall 11 are supported by a series of angle-brackets 14 upon the interior of a surrounding imperforate wall 15, which latter may be of any convenient shape—as, for example, conical, as shown in Fig. 3 of the drawings—and the exterior chamber formed by the wall 15 is closed at its top, but at its lower end is provided with a discharge-opening 16, surrounding the discharge-opening 12, above mentioned, and inclined to one side therefrom for convenience in attaching pipes to both. Within the air-escape orifice of the inner chamber is secured an adjustable rod which bears a spiral disk or air-conveyer similar in function to the conveyer 5 of Fig. 1, but modified in construction in the respect that this disk is provided at its peripheral edge with a downwardly-inclined flange, the function of which is to direct the air encountered by it toward the opening 12 in a more concentrated blast. As air enters the separating-chamber through the inlet 13 it receives a gyratory motion within the separating-chamber, and the solid matter therein is thrown by centrifugal force against the perforate cylindrical wall 10, the smaller particles thereof passing through the apertures into the surrounding chamber and from thence down and outwardly through the inclined spout 16. The coarser solid matter remaining within the chamber slides down the inclined wall of the tapered portion 11 and out of the openings 12, being assisted by the blast of air from the spiral disk. The purified air passes upwardly through the air-escape into the atmosphere. The surrounding exterior chamber above mentioned receives only the finer particles and by reason of its inclined or funnel shape conducts the same into the discharge-spout 16, the said particles being assisted in their movement by the air which passes through the screen; but undue escape of air from the separating-chamber in this manner is prevented by constricting the exit from the exterior chamber. This constriction may be effected in various ways—as, for example, by proportioning the relative sizes or positions of the interior cylindrical chamber and the exterior tapering chamber, so that the space between the two will be of the proper area to permit only the requisite quantity of air to pass therethrough from the separating-chamber. In the drawings the point of constriction is at the point of support of the interior chamber.

From the above description it will be apparent that various modifications in the shape, relative size, and in the construction of the interior and exterior chambers may be made without departing from the spirit of this invention, and, moreover, that considerable modification may be made in the structural formation of the spiral disk whereby it will more effectually carry out its function or additional functions. It is also to be understood that the drawings herein are merely representative of the principle of the above invention and is not intended to exhibit detail construction of the apparatus, which will of course be determined by the judgment of the manufacturer.

Having described my invention, what I claim, and desire to secure by United States Letters Patent, is—

1. A dust-collector comprising a tapering separating-chamber with provisions for giving the air introduced therein a gyratory motion, a central spout for the escape of purified air at the larger end and a discharge-opening at the smaller end of said chamber, in combination with a longitudinally-adjustable rod held in said spout and a spiral air-conveyer borne by said rod directing a portion of the whirling air of said chamber outwardly through the discharge-opening.

2. A dust-collector comprising an inner separating-chamber in which the air introduced therein forms a vortex, a perforated wall bounding said chamber, said chamber being also provided with an escape for purified air and a discharge-opening, a rod in said chamber and an air-conveyer mounted on said rod in combination with an imperforate wall surrounding said inner separating-chamber forming an exterior chamber for the separated particles and spaced from said perforated wall by an annular space to provide a normally open and constricted exit between said exterior chamber and its discharge-opening.

In testimony whereof I have signed my name to the specification in the presence of two subscribing witnesses.

ARTHUR C. LYNCH.

Witnesses:
G. A. TAYLOR,
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